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amount of work pulling vines the same distance. Also let  $x$ =the amount of money the man received and,  $y$ =the amount of money the boy received. Since the amounts of money are to each other as the amounts of work done.

$\therefore x:y :: d:p$ ; but  $x:y :: mp:d$ .

$$\therefore mp:d :: d:p :: x:y. \quad \therefore m = \frac{d^2}{p^2} = \frac{x^2}{y^2}.$$

$\therefore x = y\sqrt{m}$ . But since  $x+y=n$ .  $\therefore x=n-y$ .

$$\therefore y\sqrt{m}=n-y. \quad \therefore y = \frac{n}{1+\sqrt{m}}, \text{ and } x = \frac{n\sqrt{m}}{1+\sqrt{m}}.$$

Also solved by P. S. BERG, C. W. M. BLACK, J. K. ELLWOOD, M. A. GRUBER, F. P. MATZ, C. E. WHITE, J. F. W. SCHEFFER, H. C. WHITAKER, and G. B. M. ZERR.

26. Proposed by ALVIN E. SCHMIDT, Winesberg, Ohio.

Show that  $abc > (a+b-c)(a+c-b)(b+c-a)$  unless  $a=b=c$ .

I. Solution by P. S. BERG, Apple Creek, Ohio.

$$a^2 > a^2 - (b-c)^2$$

$$b^2 > b^2 - (a-c)^2$$

$$c^2 > c^2 - (a-b)^2$$

Multiplying together the corresponding members of these inequalities,  $a^2b^2c^2 > (a+b-c)^2(a+c-b)^2(b+c-a)^2$ .

$$\therefore abc > (a+b-c)(a+c-b)(b+c-a).$$

II. Solution by COOPER D. SCHMITT, M. A., Professor of Mathematics, University of Tennessee, Knoxville, Tennessee.

Such examples can be proved either by beginning with known principles and ending with the example, or beginning with the example and reducing it to known truths. I will use the latter method.

If  $abc > (b+c-a)(a+b-c)(c+a-b)$ , then  $abc > ab(a+b) + bc(a+c) + ac(a+c) - 2abc - a^3 - b^3 - c^3$  by multiplication, or  $a^3 + b^3 + c^3 + 3abc > ab(a+b) + bc(b+c) + ac(a+c)$ , but  $a^3 + b^3 + c^3 > 3abc$ . Hall and Knight's Algebra, or easily proved. Hence, *a fortiori*,  $2(a^3 + b^3 + c^3) > ab(a+b) + bc(b+c) + ac(a+c)$ , but this is true, Hall and Knight's Algebra, page 210.

Hence, the original proposition is true.

Also elegantly solved by B. F. BURLESON, F. P. MATZ, and G. B. M. ZERR.

## PROBLEMS.

36. Proposed by J. A. CALDERHEAD, B. Sc., Superintendent of Schools, Limaville, Ohio.

Resolve  $(x^2 + y^2)(x^2 + z^2)(y^2 + z^2)$  into the sum of two squares.

37. Proposed by H. M. CASH, Gibson, Ohio.

The area of the segment of a circle =  $c$ , and radius =  $r$ . Find height of segment.

38. Proposed by F. M. SHIELDS, Coopwood, Mississippi.

A man sold 2 horses and a mule for \$286.90. On the first horse he gained as much per cent. as the horse cost dollars, and gained  $\frac{5}{8}$  as much per cent. on the second horse as the first, and he loses \$9.10 on the mule. His net gain was \$86.90. What was the cost and selling price of each?